DOCUMENT RESUME

ED 397 524 EA 027 784

AUTHOR Hart, Ann W.; And Others
TITLE Problem-Solving Errors of Educational Leaders.
PUB DATE Apr 96
NOTE 22p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Administrator Effectiveness; Administrator Responsibility; Administrator Role; *Decision Making; *Decision Making Skills; Elementary Secondary Education; *Problem Solving

ABSTRACT

Problem solving is one of the most important skills that new and developing professionals must learn. The process is complex, involving information scanning, problem identification, and feedback processes requiring synthesis, interim assessments, problem error recognition and rectification, and timely and appropriate conclusions. This study used subject narratives to examine problem-solving errors of 10 novice and 10 experienced educational leaders to explore differences between the two groups' successful and less successful experiences. The study also examined the conscious and systematic learning of educational administrators in professional practice through their narrative and reflection. The differences between novices and experts emphasized the critical part that feedback from the context, recognition of errors or positive progress, and adjustment play in successful problem-solving processes in complex social settings. The data strongly suggest that administrative experiences, especially those that practitioners reflect upon and subsequently integrate into a personalized professional knowledge base, are critical to the initial training and to the ongoing professional learning of educational leaders. Although the experienced administrators made some errors usually made by novices, they relied heavily on the recognition of information needs and errors and on the continuous rectification of errors. They used the following criteria to assess the outcomes of their decisions: ambiguously defined success outcomes, reliance on vivid or extraordinary exemplars of success and failure while acknowledging the routine nature of these and other problems, and process versus outcome elements of success. Four figures are included. (LMI)

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ED 397 524

PROBLEM-SOLVING ERRORS OF EDUCATIONAL LEADERS

Ann W. Hart, University of Utah
Paul V. Bredeson, University of Wisconsin-Madison
L. Scott Marsh, University of Utah
Jay Paredes Scribner, University of Wisconsin-Madison

Introduction

Problem-solving is one of the most important skills new and developing professionals must learn. The process is complex, however, involving information scanning, problem identification, and complex feedback processes requiring synthesis, interim assessments, problem error recognition and rectification, and timely and appropriate conclusions. The adept educational leader must avoid the temptation to reach closure on the problem prematurely while not delaying action too long, must draw on past experience while not allowing past experiences to cause her to selectively ignore important or new information that contradicts her expectations and experiences.

In this complex process, problem-solving errors can be made. Consequently, reducing these errors could significantly improve the outcomes of problem solving. Researchers have found that five kinds of errors are most common among novice professionals in problem-based professional education programs. Additionally,

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experts and novices may differ systematically in the kinds of problem-solving errors to which they are most susceptible and in the way in which they recognize and rectify errors. This study used subject narratives to examine problem-solving errors of novice and experienced educational leaders to explore differences between these two groups' successful and less successful experiences and to examine implications for professional education that may be suggested by these differences. The study also examined the conscious and systematic learning of educational administrators in professional practice through their narrative and reflection.

Background

Professionals must master the knowledge base in their chosen fields, even as that knowledge base changes. They also must learn to apply that knowledge base to a unique set of individual circumstances in their daily work as professionals, combining their knowledge in new ways with each case as they work to solve the problems of their professional practice. Problem-based and cognitive approaches to professional education have become increasingly common in educational administration as well as in other professional schools (EAQ, 1993). Research with medical students, for example, has revealed that five types of errors commonly characterize the learning experiences of new

professionals: (1) pseudodiagnosticity (seeking data that will not be helpful), (2) incorrect synthesis (reaching unwarranted conclusions), (3) inadequate synthesis (failure to come to warranted conclusions), (4) premature closure, and (5) anchoring (selective lack of attention to important information, particularly when it is inconsistent with past experience) (Ramsey & Whitman, 1989). This work has been replicated and supported by research with educational administration students (Hart, 1993).

By contrast, expert problem-solving is described in quite different terms. Experts exhibit: (1) self regulation of the problem-solving process through techniques such as reflection-in-action and reflecting on action, (2) problem-relevant information searches, (3) representations of problems using abstract categories and recognized patterns, (4) identification and possession of more complex goals and goal related action connected to the problem, (5) more time spent at the beginning of the process planning overall strategies and more flexible and varied approaches to the problem, (6) more tacit or automated procedures, and (7) more sensitivity to task demands and social context (Leithwood & Steinback, 1995).

Similarly, research on expert experienced professionals suggests that they learn to "think-in-action" in Schon's terms and that their problem-solving processes become increasingly

tacit as their expertise develops. Knowledge about the differences between the thinking and problem-solving of successful experienced professionals and that of novices can provide important information about ways to enhance the effectiveness of advanced professional education and to improve the performance of working professionals (Blumberg & Cohen, 1992; Schon, 1983).

However, much of the problem-solving research on expert educational leaders examines how experts differ from other administrators in their analysis of fictionalized problems set in a static, fictionalized context rather than examining problem-solving in a dynamic context (Hart, 1993; Leithwood & Steinback, 1995). Leithwood and his colleagues, for example, report the results of research stretching over the last decade that uses this approach to understanding expert problem solving by educational administrators. By relying on hypothetical problems the research does not allow for the critical examination of the feedback loops in the problem-identification and problem-solving processes, including recognition and rectification. Consequently, this methodology washes out much of the richness of the social phenomenon and cognitive processes that characterize complex problem solving. While researchers identify components of expert problem solving in terms of complexity, describing expert educational leaders as flexible,

active, positive, opportunistic, and facile at drawing new connections from previously unrelated phenomena, hypothetical solutions to fictionalized "problems" do not allow for the leaders' own problem-solving and thinking processes to emerge in the actual professional context. These descriptors -- facile, flexible, opportunistic -- have much less meaning in a static context. The insights into problem solving provided by these studies provide only a small component of a more complex, holistic look at leadership in educational organizations.

An expanded understanding of problem-solving processes and professionals' recognition and adjustment of errors is essential to help leaders in organizations model and improve their own leadership, and this understanding requires knowledge about expert and typical or novice leaders in the settings in which they work. Schools are professional work groups requiring the application of knowledge to constantly shifting educational challenges. As expertise increases, scholars find that professionals become more adept at recognizing patterns and errors and making necessary adjustments (Simon, 1993). This facility for seeing or visualizing the organizational context and all its complexities and making appropriate adjustments and changes is needed by formal leaders in all organizations (Bredeson & Scribner, 1996). Professional visualization, a leadership model for constructing situational maps of practice,

visualizing necessary steps, and taking incremental steps to achieve the goal while applying professional knowledge, is one example of emerging leadership models that rely heavily on the application of these skills by organizational leaders (Hart & Bredeson, 1996). A better understanding of dynamic problem-solving processes is necessary to fully capitalize on these approaches to educational leadership.

Conceptual Framework

The study applies the problem-solving errors framework developed in studies of problem-based professional education programs to the analysis of administrative practice (Ramsey & Whitman, 1989). Based on cognitive learning theory, this approach relies on the reflective process and cognitive learning cycle: (1) association (relating new data to what is already know), (2) integration (seeking relationships among the data), (3) validation (determining the authenticity of ideas and feelings), and (4) appropriation (making new knowledge one's own). (Boud & Keogh, 1985; Prestine & LeGrand, 1991).

Methods

Sample

To examine the problem-solving errors and experiences of school administrators, we selected two groups of educational administrators -- 10 novices and 10 experienced school

administrators. The novice group included three men and seven women administrators/interns. Eight respondents were interns completing the field experience component of their certification program for the principalship at a major research university. One respondent was a first-year high school principal and another was in his first year as an assistant middle school principal. The experienced administrator group included seven men and three women (six university administrators, two central office administrators, and two building principals). Experienced administrators were recruited from among Ed.D. students with at least three years experience in their leadership roles and from among Ed.D. graduates of another research university.

There was little ethnic or racial diversity in the total sample. There were 17 Caucasians administrators, one African-American (an elementary school principal), one Asian (a university student affairs administrator), and one Hispanic (a higher education researcher/administrator).

Data collection

In previous studies of administrative problem-solving errors, researchers employed fictionalized accounts of administrative problems and asked respondents to identify the strategies they would employ to deal with the problems presented. (Hart, 1993; Leithwood and Steinback, 1995). Though useful as

an exploratory approach to systematic inquiry into administrator cognition, expert thinking, and problem-solving abilities, these studies were limited in that the fictionalized problems posed to practicing administrators remained static and unchanged. Thus, as each administrator dealt with a problem that remained stable and there were no changes in the problem situation as he interacted with it and worked a solution. Recognizing the phenomenological limitations of these earlier investigations and understanding the dynamic nature of administrative problem-solving situations, we used unstructured interviews, lasting from one to two hours, to ask these administrators to describe in detail two stories about their administrative work and problem-solving experiences. First, we asked them to recount a story in which they felt that they had been quite successful in identifying and solving an educational or organizational problem. During the interviews we used a variety of questioning probes to elicit elaborations of incidents and fuller descriptions of the activities, people, and contexts that surrounded the problems and their resolution. Next, we asked respondents to describe a problem-solving scenario in which they felt they had not been particularly successful or they were less satisfied with their handling of it. All interviews were recorded and later transcribed. These narratives yielded approximately 48 hours of taped interviews transcribed for coding and analysis.

Data Analysis

The analysis proceeded in three steps. First, we independently read the transcripts and coded the text for evidence of problem-solving errors. Next, we examined the narratives to understand the implicit and explicit criteria respondents used to categorize problem-solving events as successful or less successful. After the initial two stages of data analysis, the researchers compared and discussed their independent coding assessments. Where disagreements or inconsistencies were found, we discussed each, re-examined the interview transcripts, and reached consensus on the coding of data and on emerging categories and themes. Finally, we developed summary sheets of problem-solving incidents, successful and unsuccessful, for each respondent and for each group. These summaries provided a data matrix for comparisons across, between, and within administrator groups.

Results

Novice Administrators

Our first level analysis of the narratives of novice administrators' narratives describing successful and less successful problem-solving situations focussed on identifying problem-solving errors. The data indicated that novices were most susceptible to two problem-solving -- premature closure and

anchoring. Premature closure was evident in eight of the scenarios and anchoring was evident in all ten narratives. The fact that novices were susceptible to these problem-solving errors is not surprising. When dealing with critical problems, novice administrators, like experts, draw heavily on prior experiences. Novice administrators have fewer administrative experiences integrated into their professional knowledge base than do experts. That's why we call them novices. When describing less successful problem-solving experiences, their stories indicated that novices often misunderstood the nature of problem(s) and its complexity due to heavy reliance on prior experiences as classroom teachers, coaches, and counselors. As administrative interns they most often occupied two formal professional roles, one administrative the other teaching. They described the tension they felt of occupying dual professional roles as interns as one of being "caught in the middle." One intern stated. "I mean it's a great learning experience for me to see how, you know, what's happening with our new principal. But it's very frustrating for me because I'm playing both worlds. You know they're asking me because I'm a teacher and they're asking me because I'm going into administration and they think I can see it." Another interns recalled, "And I think the reason I wasn't real satisfied with this was because I am a counselor at my school and the role of counselor kind of crossed over to

principal. There was a conflict there." Novices continued to rely on experiences from professional roles that were often very different from their current role as an administrator. Their reliance on prior experiences in different roles is understandable because those experiences make up the greatest part of their professional work biography. Thus, they misread problems and often remained anchored in a former professional role perspective. As a result, they fail to consider important information as they dealt with the complexities of the situation, their choices, and the consequences of those decisions. A third problem-solving error, inappropriate scanning (seeking information that is not helpful) was also evident in the stories of novices.

Next, we examined their stories to understand what novices were telling us about what it meant to be successful or less successful in dealing with a critical problems as administrators. Five general themes emerged from their descriptions of successful problem-solving experiences. These included (1) positive feelings toward the solution and outcomes, (2) establishing trust and developing relationships, (3) effective communications, (4) success meant tangible outcomes -- products, processes, and/or relationships developed, and (5) validation of their role as administrators. In Figure 1 we use selected quotes to illustrate these themes.

Problem-Solving Themes: Successful Experiences
Figure 1

Positive feelings toward problem resolution

"When people have money stolen, I would say probably 60% of the time you never find it. You never have any closure to the issue and thought this time it was handled very quickly. Hopefully, this won't ever happen again and that is where the success is. It is not even the money issue, but the kids have learned something very important here."
This situation was also viewed as successful because of the relationships the assistant principal built with the students involved in the incident.

Relationships with others

Positive interactions with others
Trust developed

"It was relieving to just give them both a hug and they are going to come back and check in with me Thursday morning and we are going back to school, but they have also built a relationship with me through this."

Communications critical to effective problem solving

Tangible outcomes

products, processes, relationships developed

"I think it's successful because, one, the students are taking a stake in their school and they're seen is being responsible versus kids who are always in trouble or your know, don't want to contribute anything. Probably making the teachers fee better because they'll have more time to concentrate on whatever they want to concentrate and not going around picking up attendance. Hope it will make things easier for the attendance secretary and the assistant principals who deals with attendance."

Validation of novice's role as administrator

"Because everything went well. I was on my own. I really made the decision on my own after talking to a few people. I didn't really need any -- no one had to approve it."

"Probably out of the week that I was principal, that was probably the most rewarding decision I made during the week-- there were a lot of littler things that I had to do, but nothing like this. I guess I felt like an administrator when I did this because I felt this is -- we are not just playing here."

Failures and less satisfying experiences were vivid and compelling components of their professional learning that novices would draw on in the future. "I learned a lot from it. I think when I do become a principal and I get into this situation, which I know I will, I think I will know how to handle it when it comes, hopefully. I think everyone is different, but I feel better prepared doing this the next time it happens." Their stories of failures were infused with emotion and personal feelings. Situations in which they had been less successful were burned into their professional knowledge base. For example, a first-year principal describes how a negative incident was a powerful teacher.

But I'm not going to sound like a first year principal. You know because what you're looking at is how experience and how people learn over time to better resolve situations without getting themselves burned too badly. And usually when you get burned badly it's because you've done or made decisions on your own or you've set up to make a decision and you haven't recognized it. But the most distasteful experience I had was also in Janesville. And that was in relationship to an athletic board violation to a party that we had etc. etc. It was a huge beer party with athletes and stuff like that.

Being there for only a year and I think, as most administrators do, they want to help. They want to do as much as they can to - if a teacher asks you to .... go help and do what you can. And so I went out there. Decided to help with the investigation - I didn't plan on talking with the kids or anything I just was going to help him [assistant athletic director] set up what he should.

Well he needed help and I knew it, see I recognized it but I thought you know, I was bright enough and smart enough, etc. in experience to not to be able to handle it. But I knew I was being set up. I knew he didn't want to do it because of the names of he people. But I thought my integrity, my reputation, all the things that I had done in the past, were going to keep me on the right and straight and narrow. And so I got up there and started interviewing the kids. Just like I had always done. Everybody knew they were being busted for a party.

I spent about 40 hours on it while - my assistant athletic director's doing nothing. And because I knew that I was being set up I made sure that I took proper notes and etc. While cutting through the muck, the group [student athletes interviewed] hires an attorney and they turn everything that I harangued and I had badgered, and that I had mistreated kids and this and that and so on and so forth. And now I'm in front of the school board and it's all my fault. And it is.

I did not know that I was going to be hung out to dry. By the administration, by the superintendent, by the people above me, you know, and that kind of thing. I didn't realize that I was going to be the whipping point.

Six general themes emerged from novices' descriptions of less successful problem-solving experiences. Their descriptions of less successful experiences were punctuated with feelings of

1) powerlessness; 2) being caught in the middle; 3) being captured by the problem; and 4) doubts about professional legitimacy. The fifth and sixth center on the nature of leadership and organizational problems they encountered. Novices viewed these problems situations as 5) messy and ill-defined; and less successful experiences were 6) vivid and glaring reminders of gaps in their professional knowledge and practice. In Figure 2 we use selected quotes to illustrate each theme.

Problem-Solving Themes: Less Successful Experiences

Figure 2

Powerlessness

"I guess I felt kind of helpless. I didn't know what to do in that situation. I was trying not to be a counselor-- trying to make some kind of decision that had to be made pretty soon and the only decision that we came up with was to talk to the superintendent, if that is any kind of a decision."

Caught in the Middle

"I felt like I was kind of like the person caught in the middle. Because the principal said here's a project for you and the assistant principal said, 'Wait a second, what are you doing.' Kind of like, this is my territory."

Captive of Problem and Solutions

"I mean I do like split second decisions. And in doing whatever, I kind of thrive on action, but sometimes the haste is not such a good idea and I found that out today real quick. That I needed some background and I didn't have it."

Doubts about Administrator Legitimacy

"I was waiting for them to define my role. I knew what I wanted to do. But I didn't know-- I didn't feel that that probably was the role they wanted me to take and I think had they- had principal been down, there, I wouldn't of taken that role."

Vivid Experiences

Well, I ended up hiring a lawyer to protect myself so that I didn't get myself in trouble. So it was kind of -- yes, thousands of dollars, of money so probably it was financial."

Messy and Ill-defined Problems

"I guess a combination of all of those that it was thrown into my lap and no one seemed to know anything. It was a big mess. I guess that is how I describe it because the teachers didn't know what was going on, I didn't know what was going on, the superintendent really didn't know what was going on. Even the parent really didn't understand what was going on through this whole thing."

Next we present a summary of our findings from interviews with experienced administrators. The differences between novices and experts in this comparative study emphasize the critical part that feedback from the context, recognition of errors or positive progress, and rectification or adjustment play in successful problem-solving processes in complex social settings such as education. These data strongly suggested that administrative experiences, especially those that practitioners reflect upon and subsequently integrated into a personalized professional knowledge base, are critical to the initial training and to the on-going professional learning of educational leaders.

Experienced Administrators

As the analysis of the data progressed, it became apparent that the rational, highly linear descriptions of both expert educational leaders' problem-solving and the problem-solving errors of novices or typical educational leaders developed from fictionalized problem-solving exercises did not adequately capture the process. The ten experienced administrators interviewed in this study described their problem-solving experiences in interactive and iterative terms. As they reflected on their less successful experiences, they described how they had failed to heed evidence that required iterations and adjustments, succumbed to pressure in the problem-solving environment to reach a quick conclusion (premature closure) or come to a conclusion that was customary or conventional in their work environments (incorrect synthesis), or assumed similarities between the new and previous problems that they faced that made them ignore incoming information that was important (anchoring). While their accounts revealed instances of information search both appropriate and inappropriate; incorrect or inadequate synthesis and appropriate synthesis and conclusions; premature or timely closure; and anchoring or attending to new, discordant information, they relied heavily on the recognition of information needs and errors and continuous adjustment and

rectification of errors. They also described critical contextual, human, and organizational variables affecting their problem solving that grouped into four categories: (1) the socio-technical system, (2) personal resources, (3) the environment, and (4) human relations.

Critical Variables Affecting Problem Solving:

Experienced Administrators

Figure 3

Socio-technical system in the organization
- politics, power & influence, internal competition
- coalitions, networks, collaboration
- technical processes
- culture, including roles, norms, and values
- social processes, including social learning, group think, social information processing
- control over information

Personal resources
- self awareness
- consultation with experts
- knowledge & experience
- personal style or leadership style
- cognition, including sensemaking or personal information processing, level of analysis (holistic versus fragmented), and synthesis, closure, and anchoring
- problem-solving errors
  - judgment
- the use of a back-up plan or plans

Environment
- contextual politics, including interorganization and community buffering
- government politics and the regulatory environment
- level of analysis
- ambient culture.

Human relations

confronting unpleasant interactions
reframing closure to accommodate social pressure
face-saving behavior
buffering people from each other and the context
affect or feelings

Additionally, the criteria the experienced leaders gave for assessing their relative success or failure revealed much about the problem-solving context in educational organizations. These context issues emerged frequently in their stories: (1) ambiguously defined success outcomes (including (a) a paucity of activities with objective outcome measurements, (b) conflicting outcome criteria often depending on the level of problem analysis, and (c) lack of agreement on outcome criteria); (2) reliance on vivid or extraordinary exemplars of success and failure while acknowledging the routine nature of these and other problems; and (3) process versus outcome elements of success. The respondents reflected frequently on experiences in which the problem-solving process seemed to them at the time to be appropriate, but they were unhappy with the outcomes of the process. The successful process elements often centered around satisfactory human resource effects or feelings. The outcome choices related either to goal achievement and effects on the organization or its clients or on the effect of the outcome on

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the leader, involving either people's judgments of the leader or his career progress opportunities.

Criteria for Judging Success of Problem-Solving

Figure 4

Ambiguous defined success outcomes

paucity of objective outcome measures

conflicting outcome measures

disagreement about desired outcome measures

Vivid or extraordinary examples

Contrasting with the routine nature of many problems faced in the organization

Process versus Outcome

including the ambiguity of an appropriate process yielding an undesirable outcome

The facility with which professionals, novice and expert, apply their knowledge to the actions taken in unique circumstances is a hallmark of professional practice. Professionals must be adept at the problem-solving process as well as masters of a content knowledge. While scholars can identify errors among novices in training, we know little about

the evolving process of making errors and identifying and rectifying these errors and the relationship of this process to the learning cycle for educational leaders and other professionals. This study advances knowledge about problem-based professional education programs, their impact on student learning, and the cognitive relationship of the problem-solving process to ongoing professional learning and expertise.

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